

Of course, everybody knows that the practice above alluded to of ending a minor piece with a major chord is by no means uncommon with Bach. For example, in his "Grosse-Passions-Musik," the chorus which follows the duet, "My Saviour Jesus now is taken," ends (according to the English version by Miss Johnston) with the words, "the treach'rous betrayer, the murderous throng." Bach has reiterated them—the first time with a minor chord (E), with G natural, on the word "throng"; the second time with a chord on the same key-note, but with a major third (G sharp) and a pause. The effect is thrilling. Surely there could have been no allowance for drop here. Handel, on the contrary, begins and ends his chorus, "And He shall purify," in the "Messiah," in G minor, although the two succeeding pieces are in D major, with which key the previous piece would have been brought into relationship by the raising of the third.

This is a digression from the subject of your correspondents' letters, which probably never entered the minds of the great masters named.

R. FREEMAN.

London, February 3.

A Lunar Romance.

Is not Mr. Wells right in the description of the effect referred to by the reviewer of his "First Men in the Moon" (p. 218)? The sphere itself, as a whole, is *not* attracted by gravity. The action of gravity has effect only in the line (?) through the open window, and, *quâd* the sphere, would only affect that part which would be directly in a straight line from the moon through the window.

F. C. CONSTABLE.

Wick Court, near Bristol.

IN answer to Mr. Constable, I think we cannot allow that the sphere is not attracted by gravity. I understand it to be a sphere of solid glass, PQ, inside a cavorite covering, RS (Fig. 1).

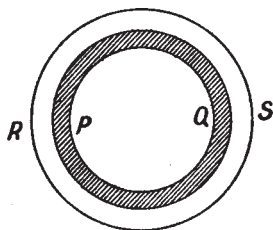


Fig. 1.

In the case considered, the covering is removed through a wide angle AB, thus described (p. 62): "Four windows were open in order that the gravitation of the moon might act upon all the substances in our sphere." Hence the gravitational beam

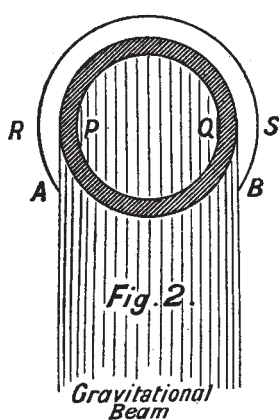


Fig. 2.

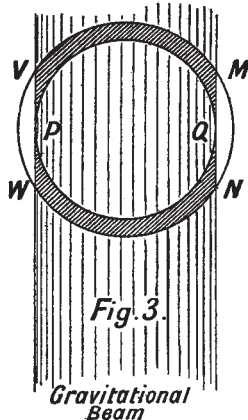


Fig. 3.

reaches the whole of the glass sphere itself (Fig. 2); unless (Fig. 3) Mr. Wells means to reserve little pieces, VW and MN, at the sides outside the beam. In this case the total mass of

the sphere remains the same, but is not all acted on by gravity; so that the acceleration of the whole would be *less* than g (in the ratio of mass acted on to total mass), *i.e.* less than that of objects within, which would promptly settle to the "floor."

If Mr. Wells was thinking in this subtle fashion I withdraw my criticism, and Mr. Constable will see that I have left an open door for myself in the review for withdrawal. I may say it was left open expressly in view of this possibility. But the context does not suit this view at all well.

THE REVIEWER.

Cherry Leaf Disease.

THE question raised by Sir W. T. Thiselton-Dyer's letter is a very important one, and I venture to offer a few observations on it.

It is impossible that Mr. Bennett—still more Mr. Carruthers—could have intended to suggest that the experts at Kew and the British Museum are not competent to investigate such diseases as the above when they are submitted to them. They probably meant that an organised system is wanted in every county, by means of which an outbreak of any such disease should be at once brought under their notice. This could only be satisfactorily done by local inspectors, who would be in touch with the farmers on the one hand and the experts on the other. It should be part of their duties to keep accurate records of temperature and rainfall in order to show the connection, if possible, between these and the disease. These officials would naturally be appointed and paid by the County Council.

As regards the outbreak of Gnomonia mentioned by Sir W. T. Thiselton-Dyer, it is a curious fact that in most of the orchards about here affected by it in 1900 the disease has almost disappeared, though no preventive measures such as stripping the leaves were taken. It would, however, be very unfair to blame the advisers of the Royal Agricultural Society for raising a false alarm; in the case of a disease not known to have occurred in this country before, they were clearly bound to act upon the best information they could get—that of Frank—and warn the farmers. The more equable climate of England, as compared with Germany, is probably the cause of the different result, the effects of comparatively small differences of temperature and moisture being vastly more important than is generally believed.

ALFRED O. WALKER.

Ulcombe Place, near Maidstone, February 2.

Extremes of Climate in the British Empire.

YOUR correspondent (p. 299) who writes under this head in the current number of NATURE would make the labours of an editor as super-Herculean as those of the Highland minister who was called upon to incorporate the whole body of divinity in every sermon lest his flock should be misled.

That it would be wrong to generalise on the climates of the British Empire from eighteen stations, or to claim any one of them as the hottest or the wettest point, is obvious; but even in the few lines of your abstract you have not done this, and in my original summary (*Symons's Meteorological Magazine*, November, 1901, p. 167) I said:—

"It is true that neither the hottest, the coldest, the wettest nor the driest points in the Empire are dealt with; and the reader is warned, as on each previous occasion of presenting this annual summary, not to take the figures as meaning more than they profess to convey."

In order to secure continuity in the records, which are published monthly, it is necessary to obtain them from regular observatories: these are, unfortunately, few; but, fortunately for the student of climatology, they are usually situated in districts of normal rather than of extreme climate. Additional observations would certainly be welcome, and I hope during the present year to be able to publish monthly records from at least twenty-five stations in all the Britains.

HUGH ROBERT MILL.

62 Camden Square, London, N.W., January 31.

Elementary School Mathematics.

IN connection with the present discussion on the teaching of elementary mathematics in schools, and the recommendation made by many experienced teachers that much use should be made in geometry—at any rate in the earlier stages of actual

measurements of lengths of lines, may I suggest that such measurements should always be made in centimetres? A handy steel rule, six inches long, graduated both in inches and tenths, and in centimetres and millimetres, can be bought for a few pence, and is easily carried in that almost omnivorous receptacle—the pocket of a schoolboy. The use of such a rule would beget familiarity with the metric scale, in itself an advantage for any boy whose education includes some knowledge of elementary physics. But more—the schools of the country would soon be sending out each year a body of educated men acquainted more or less with the advantages of the metric system, and their influence can scarcely fail to be helpful in hastening the general adoption of the metric system—a change so much to be desired both in education and in practical life.

Fettes College, Edinburgh.

JOHN S. YEO.

Electrification of Glass.

REFERENCE is commonly made, in text-books of electricity, to the uncertainty of kind of the electrification produced on glass when it is rubbed with fur or flannel, opposite results being obtained with different specimens.

The following is a variation which I have not seen mentioned. A strong positive charge may be given to a smooth rod of soda-glass, by rubbing it gently with a certain piece of fur. Vigorous rubbing, on the other hand, produces an equally good negative electrification. Thus the two sorts may be produced in quantity at one stroke, by making the friction small at first and finishing with a vigorous pull. The half-way region of zero electrification may be displaced at will.

A piece of lead glass seems to be always positively electrified by this particular piece of fur.

F. HODSON.

North Eastern County School, Barnard Castle, January 28.

THE DANGEROUS SIDE OF INDIA.¹

AT the present time much interest attaches to the North-West Frontier of India, and to Afghanistan, the Beluch country and the Persian Gulf. Sir Thomas Holdich's book, therefore, is opportune as well as of remarkable value. It must be carefully studied by everyone desirous of forming an intelligent opinion about our Indian frontier policy. The politician, the military expert, the dilettante student, the thoughtful citizen of the Empire, all will gain much from its well-written pages. Moreover, although the chief and permanent value of this admirable work is topographical, the general reader merely in search of mental enjoyment will find a peculiar pleasure in the vivid descriptions of stirring incident and picturesque countries. The style is always easy and graceful, while it rises frequently to singular eloquence and poetry. Rarely are sound knowledge and expert opinions offered to the public in a form at once so simple and attractive.

A cultured survey officer of the Indian Service has clearly very enviable opportunities for varied experiences; but it requires a quiet observant mind, sanitary with humour, to vitalise scenes and peoples as they appear in this record of twenty years' work on the restless Indian frontier. Of the various districts and wild folk shown to us, some are more especially in one's thoughts at the present moment. The political temperature of parts of the Punjab frontier is just now simmering or even ebullient. In Swat there is the outward aspect of peace without cheerfulness. How much this is due to the dominance of our big battalions in that historic valley and how much it is due to the vast number of strong fighting men, fierce of heart and light of foot, who were killed there during the 1897-98 uprising it is hard to decide. No one, however, seems to assert that the people like our presence among them. When the sullen youths shall be grown enough to strike another blow for Islam, we may expect more trouble in that

¹ "The Indian Borderland, 1880-1900." By Colonel Sir T. Hungerford Holdich, K.C.I.E., C.B., F.S.A., late of the Indian Survey Department. Pp. xii + 397. (London: Methuen and Co., 1901.)

sickly district, especially if the garrison is diminished. The less fanatical Orakzais and Afridis sit complacent, but watchful. Satisfied with their last display of fighting prowess, they are ready, on the instant, to rush to the rally if their freedom of rascality is threatened or their subsidies are reduced. Further south, in Waziristan, we have gone back to the old plan, the ancient way, of surprise and counter raid, the burning of homestead and tower. Also in the organisation of the new frontier province, of which so much has been written, Lord Curzon has reverted to more primitive methods. Complex forms of administration have been replaced by a rougher, not necessarily less efficient system. The mere lawyer and the pleader are beggared in importance, and the "political officer," raised aloft in power, is to be mantled with responsibility. It is admittedly a putting back of the clock. Curious, not always friendly, eyes watch the experiment. Its success mainly depends upon the attractions dangled before the eyes of able officials to draw them from easier days, and domestic joys, to rugged solitary work in desolate places. Beluchistan is placid and peaceful. It is the more primitive type of frontier management. To this simple pattern the new frontier province is to be retrograded by the forcible suppression of many functions and recent developments, which until now were gloried in as triumphs of British rule in India. But not only are the political and ethnological conditions of Beluchistan and the new frontier province dissimilar, but a Sir Robert Sandeman is not the product of every day.

Then behind all these borderland experiments stands dubious Afghanistan watching curiously its new Amir, full of conjecture, moreover, about the refugee pretender in the hands of the Russians, and that other refugee pretender, the honoured guest of the British at Rawalpindi. It is no easy task to rule the turbulent, faithless Afghan tribes, and the peaceful succession of the present ruler of Kabul may be followed at any moment by some wild upheaval of ambition or of revenge on the son for the savage repressions of his father. Herat, and the Russians peering wistfully at that coveted if somewhat corroded "Key of India," must always be of anxious interest to all students of the Afghan frontier and to all lovers of peace.

To understand the real value to India of all these differing countries, and to estimate accurately their relative importance, a thorough comprehension of Sir Thomas Holdich's facts and geographical opinions is an essential precedent condition. He has something important to say on all the pressing questions concerning the north-west limits of India, some solid physical basis to disclose or to explain, ignorance of which must make reasonable conclusions impossible. That strange diplomatic instrument the "Durand" treaty has a chapter to itself. Surely no more curious or less sincere arrangement was ever concluded between the Government of India and an adjoining Power. By it a definite frontier line has been laid down and actually demarcated. On one side of this line the Amir is to maintain order and never again to throw covetous glances beyond the boundary pillars which define its course. We, on our part, accept responsibility for all the independent tribes which intervene between the pillars and our Punjab territory. The Amir can fulfil his promises, while obviously we can only keep to our agreement by first subjugating this wild mountain land. Misdemeanours against Afghanistan by the tribes nominally under our responsibility, but actually uncontrolled by us, can only be punished by the Amir sending raiding parties into the very country he has promised not to enter. We have to wink at these flagrant violations of a solemn treaty because we ourselves never had any intention of obeying its terms.

Such loose acceptances of frontier responsibility are,